

**AMENDMENTS TO THE CLAIMS:**

This listing of claims replaces all prior versions and listings of claims in the application.

**Listing of Claims:**

Claim 1 (Currently Amended): A method for determining a regular N-polygonal figure for a boring hole having vertexes of N in number, characterized in that:

the center point (S) of a regular N-polygonal figure to be determined is set as a fixed point;

a point, which is distant by a certain length from the said center point (S) and revolves around the center point (S), is set as a first point (E);

a point, which is distant by a certain length from the first point (E) and revolves around the first point (E), is set as a second point (M); and

assuming that the second point (M) revolves around the first point (E) at an angular velocity  $\omega$ , that the first point (E) revolves around the center point (S) at an angular velocity  $(1-N) \omega$ , that the first point (E) is away from the center point (S) by a distance (r), and that the second point (M) is away from the first point (E) by a distance  $(N-1)^2 r$ , the locus of the second point (M) defines a contour of a regular N-polygonal figure to be determined being circumscribed on a circle having a radius  $N(N-2)r$ ; and

boring a hole having a shape defined by the contour of the regular N-polygonal figure.

Claim 2 (Currently Amended): A method for determining a regular N-polygonal figure for a boring hole having vertexes of N in number, characterized in that:

a regular (N-1)-polygonal figure revolves along a circle, which circle is concentric to the center of a regular N-polygonal figure to be determined and has a radius r, and rotates at an angular velocity  $\omega$ ;

a contour of the said regular  $(N-1)$ -polygonal figure is inscribed on a circle having a radius  $(N-1)^2r$ ;

the regular  $(N-1)$ -polygonal figure revolves at an angular velocity  $(1-N)\omega$ ; and

an area being swept by the said regular  $(N-1)$ -polygonal figure defines a regular  $N$ -polygonal figure to be determined, which figure is circumscribed on a circle having a radius  $N(N-2)r$ ; and

boring a hole having a shape defined by the regular  $N$ -polygonal figure.

Claim 3 (Currently Amended): A method for determining a regular  $N$ -polygonal figure for a boring hole having vertexes of  $N$  in number, characterized in that:

a regular  $(N+1)$ -polygonal figure revolves along a circle, which circle is concentric to the center of a regular  $N$ -polygonal figure to be determined and has a radius  $r$ , and rotates at an angular velocity  $\omega$ ;

a contour of the said regular  $(N+1)$ -polygonal figure is inscribed on a circle having a radius  $(N+1)^2r$ ;

the regular  $(N+1)$ -polygonal figure revolves at an angular velocity  $(N+1)\omega$ ; and

an area being swept by the said regular  $(N+1)$ -polygonal figure defines a regular  $N$ -polygonal figure to be determined, which figure is circumscribed on a circle having a radius  $N(N+2)r$ ; and

boring a hole having a shape defined by the regular  $N$ -polygonal figure.

Claim 4 (Currently Amended): A method for determining a figure for a boring hole comprises steps for:

setting a fixed center point;

setting a first point which is away from the center point by a certain length and revolves around the center point;

setting a second point which is away from the first point by a certain length and revolves around the first point;

setting an angular velocity  $\omega$  at which the second point revolves around the first point;

setting an angular velocity  $(1-N)\omega$  at which the first point revolves around the center point;

setting a distance between the first point and the center point as a distance  $r$ ;

setting a ratio of the distance between the center point and the first point to the length of a line segment connecting the first and second points being smaller than  $(N-1)^2$ ; and

defining a figure to be determined by the locus of the second point, which figure has vertexes of  $N$  in number, is circumscribed on a circle having a radius  $N(N-2)r$ , and is a single closed region formed by curves; and boring a hole having a shape defined by the figure.

Claim 5 (Currently Amended): A method for determining a figure for a boring hole comprises steps for:

setting a fixed center point;

setting a first point being away from the center point by a certain length and revolving around the center point;

setting a second point being away from the first point by a certain length and revolving around the first

point;

setting an angular velocity  $\omega$  at which the second point revolves around the first point;

setting an angular velocity  $(1-N)\omega$  at which the first point revolves around the center point;

setting a distance between the first point and the center point as a distance  $r$ ;

setting a ratio of the distance between the center point and the first point to the length of a line segment, which connects the first and second points, being smaller than  $(N-1)^2$ ; and

defining a figure to be determined by the locus of the second point, which figure is made up of a plurality of closed regions formed by curves and is symmetric with respect to the center thereof; and

boring a hole having a shape defined by the figure.

Claim 6 (Currently Amended): An apparatus for determining a regular N-polygonal figure for a boring hole having vertexes of N in number, characterized in that the said apparatus includes an input means and a control means,

the said input means is constructed to carry out functions for:

setting a center point of a regular N-polygonal figure to be determined as a fixed point;

setting a first point which is away from the center point by a certain length and revolves around the center point;

setting a second point which is away from the first point by a certain length and revolves around the first point;

setting an angular velocity  $\omega$  at which the second point revolves around the first point;

setting an angular velocity  $(1-N)\omega$  at which the first point revolves around the center point;

setting a distance  $r$  between the first point and the center point; and

setting a distance  $(N-1)^2r$  between the second point and the first point: and

that the said control means is constructed so as to carry out functions for defining a regular N-polygonal figure to be determined by the locus of the second point, which figure is circumscribed on a circle having a radius  $N(N-2)r$ ; and

boring a hole having a shape defined by the regular N-polygonal figure.

Claim 7 (Currently Amended): An apparatus for determining a regular N-polygonal figure for a boring hole having vertexes of N in number, characterized in that the said apparatus includes an input means and a control means,

the said input means is constructed to carry out functions for:

inputting so as to revolve a regular (N-1)-polygonal figure along a circle, which circle is concentric to the center of a regular N-polygonal figure to be determined and has a radius r;

inputting so as to rotate such the regular (N-1)-polygonal figure at an angular velocity  $\omega$ ;

setting the regular (N-1)-polygonal figure so as to define a contour which is inscribed on a circle having a radius  $(N-1)^2r$ ; and

setting an angular velocity  $(1-N)\omega$  at which the regular (N-1)-polygonal figure revolves: and

that the said control means is constructed to carry out a function for defining a regular N-polygonal figure to be determined, which is circumscribed on a circle having a radius  $N(N-2)r$ , by an area being swept by the regular (N-1)-polygonal figure; and

boring a hole having a shape defined by the regular N-polygonal figure.

Claim 8 (Currently Amended): An apparatus for determining a regular N-polygonal figure for a boring hole having vertexes of N in number, characterized in that the said apparatus includes an input means and a control means,

the said input means is constructed to carry out functions for:

inputting so as to revolve a regular (N+1)-polygonal figure along a circle, which circle is concentric to the center of a regular N-polygonal figure to be determined and has a radius  $r$ ;

inputting so as to rotate such the regular (N+1)-polygonal figure at an angular velocity  $\omega$ ;

setting the regular (N+1)-polygonal figure so as to define a contour which is inscribed on a circle having a radius  $(N+1)^2 r$ ; and

setting an angular velocity  $(N+1)\omega$  at which the regular (N+1)-polygonal figure revolves: and

that the said control means is constructed to carry out a function for defining a regular N-polygonal figure to be determined, which is circumscribed on a circle having a radius  $N(N+2)r$ , by an area being swept by the regular (N+1)-polygonal figure; and

boring a hole having a shape defined by the regular N-polygonal figure.

Claim 9 (Currently Amended): An apparatus for determining a figure for a boring hole, characterized in that the said apparatus includes an input means and a control means, the said input means is constructed to carry out functions for:

setting a center point as a fixed point;

setting a first point which is away from the center point by a certain length and revolves around the

center point;

setting a second point which is away from the first point by a certain length and revolves around the first point;

setting an angular velocity  $\omega$  at which the second point revolves around the first point;

setting an angular velocity  $(1-N)\omega$  at which the first point revolves around the center point;

setting a distance  $r$  between the first point and the center point;

setting a ratio of the distance between the center point and the first point to the length of a line segment, which connects the first and second points, being smaller than  $(N-1)^2$ ; and

the said control means is constructed to carry out a function for defining a figure to be determined by the locus of the second point, which figure has vertexes of  $N$  in number, is circumscribed on a circle having a radius  $N(N-2)r$ , and is a single closed region formed by curves; and

boring a hole having a shape defined by the figure.

Claim 10 (Currently Amended): An apparatus for determining a regular  $N$ -polygonal figure for a boring hole, characterized in that the said apparatus includes an input means and a control means,

the said input means is constructed to carry out functions for;

setting a center point as a fixed point;

setting a first point which is away from the center point by a certain length and revolves around the center point;

setting a second point which is away from the first point by a certain length and revolves around the first point;

setting an angular velocity  $\omega$  at which the second point revolve around the first point;

setting an angular velocity  $(1-N)\omega$  at which the first point revolves around the center point;

setting a distance  $r$  between the first and the center point; and

setting a ratio of the distance between the center point and the first point of the length of a line segment, which connects the first and second points, being smaller than  $(N-1)^2$ ; and that

the said control means is constructed to carry out a function for defining a figure to be determined by the loans of the second point, which figure is made up of a plurality of closed regions formed by curves and its symmetric with respect to the center therefore; and

boring a hole having a shape defined by the figure.